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MEMORANDUM

DATE: May 18, 1989

TO: John Osborn, FIT-RPO, USEPA, Region X

THRU: Jeffrey Villnow, FIT-OM, E & E, Seattle

FROM: Tracy Yerian, Senior Chemist, E & E, Seattle

SUBJ: Polychlorinated Biphenyl Screening Results
Magnum Salvage/Horizon Vehicles
Albany, Oregon

REF: TDD F10-8903-002
PAN FOR0222SC

CC: Andrew Hafferty, FIT-AOM, E & E, Seattle
Gerald Muth, DPO, USEPA, Region X
Bruce Woods, ESD, USEPA, Region X

Transmitted herewith are the results for the field screening analyses at the Magnum Salvage/Horizon Vehicles, Albany, Oregon site.

DAI:rls

Enclosures

POLYCHLORINATED BIPHENYL SCREENING RESULTS

MAGNUM SALVAGE/HORIZON VEHICLES ALBANY, OREGON

TDD F10-8903-002
PAN FOR0222SC

Investigation Date: April 1989

FIT Analytical Team: Tracy Yerian and David Ikeda

Report Date: May 1989

Submitted to: John E. Osborn, Regional Project Officer
Field Operations and Technical Support Branch
U.S. Environmental Protection Agency
Region X
Seattle, Washington

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1.0 INTRODUCTION

Analytical screening of 38 soil samples, collected at Magnum Salvage/Horizon Vehicles, was performed by Ecology and Environment, Inc. (E & E) Field Investigation Team (FIT) chemists under Technical Directive Document (TDD) F10-8903-002, utilizing the E & E base laboratory in Seattle, Washington. The samples were screened for polychlorinated biphenyls (PCBs) to acquire analytical data as an integral part of the Screening Site Inspection (SSI). In addition, six quality control samples were analyzed to monitor analytical method performance and to ensure data validity.

Samples were analyzed using Field Analytical Support Project (FASP) techniques detailed in Section 2.0 of this report. As required by the USEPA Region X, FASP data are annotated with the data qualifier "F" indicating that FASP methodologies were employed to generate the data. As such, qualitative data is defined as tentatively identified and quantitative data should be interpreted as estimated quantities.

Samples were screened for the following polychlorinated biphenyls:

Polychlorinated Biphenyls:	Aroclor 1016	Aroclor 1248
	Aroclor 1221	Aroclor 1254
	Aroclor 1232	Aroclor 1260
	Aroclor 1242	

The samples were received at the laboratory April 14, 1989. All soil samples were extracted April 17 and 18, 1989, and quantitation analysis were performed within 6 days of extraction.

2.0 FIELD SCREENING METHODOLOGY FOR POLYCHLORINATED BIPHENYLS

2.1 Sample Preparation Methods

The sample extraction technique for PCBs in soil is as follows:

1) Add 2 to 3 grams of soil to a tared and labeled culture tube, weigh and record to the nearest .01 g.

2) Add 1 mL of nanograde methanol to the culture tube.

3) Vortex for 30 seconds to break dry soil clods.

4) Add 10.00 mL nanograde hexane to the culture tube.

5) Vortex for 60 seconds.

6) Transfer a 3- to 5-mL aliquot of the hexane layer to a second, labeled culture tube.

7) Add 1.0 mL concentrated sulfuric acid.

8) Vortex for 60 seconds.

9) Centrifuge for 60 seconds.

10) Transfer a 2- to 4-mL aliquot of the hexane layer to a third, labeled culture tube.

11) Inject sample.

2.2 Sample Analysis

The solvent flush injection technique was used for the polychlorinated biphenyl quantitation and confirmation analyses. Two microliters of nanograde hexane, 0.5 µL of air, and 2 µL of sample were drawn into a 10-µL syringe and immediately injected into a Shimadzu GC Mini-2 equipped with an Electron Capture Detector (ECD).

2.3 Instrument Parameters

2.3.1 Quantitation Column

Instrument:	Shimadzu GC Mini-2 with ECD
Integrator:	Shimadzu Chromatopac C-R3A Data Processor
Column:	1.8m x 3mm 1.5% SP-2250/1.95% SP-2401
Carrier Gas:	Ultrapure 5% methane in argon - flow 40 mL/min.
Oven:	225°C - Isothermal
Detector/Injector:	250°C
Injection Volume:	2 microliters
G.C. Analysis Time:	25 minutes

2.3.2 Confirmation Column

Instrument:	Shimadzu GC Mini-2 with ECD
Integrator:	Shimadzu Chromatopac C-R3A Data Processor
Column:	1.8m x 3mm 3% OV-1 on 100/120 Supelcoport
Carrier Gas:	Ultrapure 5% methane in argon - flow 40 mL/min.
Oven:	225°C - Isothermal
Detector/Injector:	250°C
Injection Volume:	2 microliters
G.C. Analysis Time:	30 minutes

2.4 Sample Quantitation

2.4.1 Initial Calibration

Samples were quantitated using the external standard method. Aroclor 1254 standards were prepared by dilution of a primary standard.

Prior to sample analysis, an initial calibration was performed to obtain detector calibration factors (CFs), using the following equation:

$$CF = \frac{\text{Standard Peak Area}}{\text{Concentration of Standard Injected}}$$

During the initial calibration, CFs were determined by generating a three point calibration curve of Aroclor 1254. Standard concentrations of 0.5 ppm, 1.0 ppm, and 5.0 ppm were selected to bracket expected sample extract concentrations. To ensure detector linearity, the percent relative standard deviation (%RSD) for the CFs, as calculated by the equation below, was confirmed as less than 25 percent.

$$\% \text{ RSD} = \frac{\text{CF Standard Deviation}}{\text{Mean CF}} \times 100$$

A one point calibration of 1.0 ppm was performed for all other Aroclors detected (or suspected) in the samples.

2.4.2 Continuing Calibration

A continuing calibration was performed daily to ensure detector stability and to generate a CF for sample quantitation. A 1.0 ppm Aroclor 1254 standard was injected in the gas chromatograph and the new CF calculated. The percent differences (%D) between the CF for the continuing calibration standards and the mean CF ($\overline{CF}$) for the initial calibration standards, were calculated using the following equation:

$$\%D = \frac{\overline{CF} - CF}{\frac{\overline{CF} + CF}{2}} \times 100$$

CFs stored in the integrator were updated with new values daily unless the %D between the new CF and the $\overline{CF}$ exceeded 25 percent. When this occurred, a new initial calibration was performed.

2.4.3 Sample Analysis

Following instrument calibration, a 2.0-µL aliquot of the hexane extract was injected into the GC for analysis. The time required for chromatographic analysis to ensure all compounds had eluted off the column was 25 to 30 minutes.

Sample and standard chromatograms were printed out on the integrator at the end of each run. Aroclors were identified utilizing peak pattern matching of sample and standard chromatograms. If a pattern was identified as a specific PCB, the sum of peak areas was used to compute the concentration by the following equation:

Solid samples:

$$\text{Conc. } (\mu g/kg) = \frac{\text{Sum of Peak Areas} \times \text{Extract Volume } (\mu L) \times \text{Dilution Factor}}{\text{CF} \times \text{Sample Weight } (g) \times \text{Injection Volume } (\mu L) \times \text{Number of Peaks}}$$

The integrator can be programmed to make all or part of these calculations. An injection volume of 2 µL, a sample weight of 2.0 grams, and an extract volume of 10 mL was programmed into the integrator. Five peaks were selected for each Aroclor that was quantitated. Areas were corrected by the analyst to actual sample weight and dilution factor. Qualitative identifications were based on retention times compared to known standards analyzed under the same analytical conditions. If the PCB concentration PCB in the sample exceeded the concentration of the highest standard, the sample extract was diluted with hexane and reanalyzed.

2.5 Example of Standard PCB Chromatograms

2.5.1 Quantitation Column

Examples of Aroclor 1242 (Figure 2.1), Aroclor 1248 (Figure 2.2), Aroclor 1254 (Figure 2.3), and Aroclor 1260 (Figure 2.4) using the quantitation column are shown on pages 5 through 7.

2.5.2 Confirmation Column

Examples of Aroclor 1242 (Figure 2.5), Aroclor 1248 (Figure 2.6), Aroclor 1254 (Figure 2.7), and Aroclor 1260 (Figure 2.8) using the confirmation column are shown on pages 8 through 10.

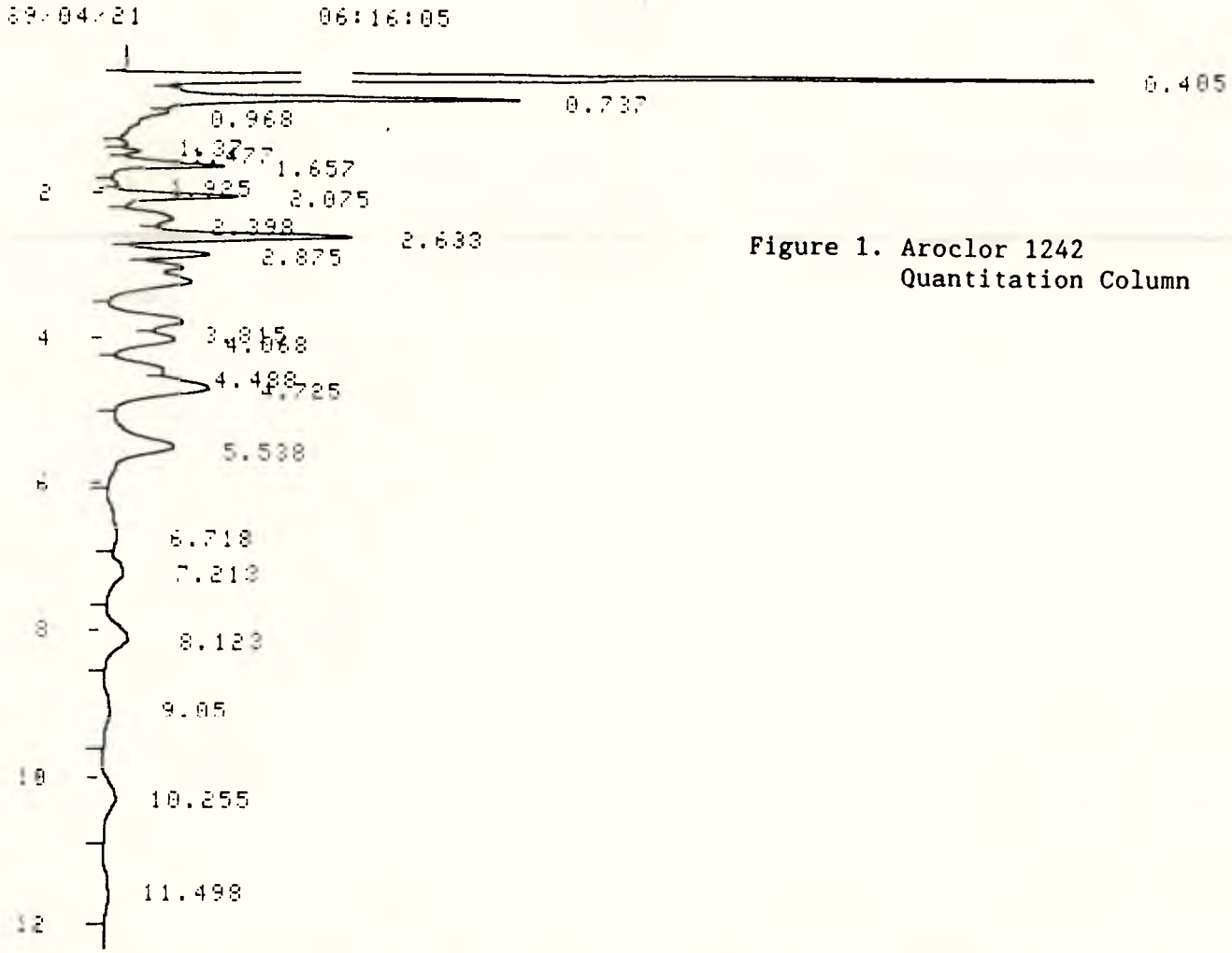


Figure 1. Aroclor 1242
Quantitation Column

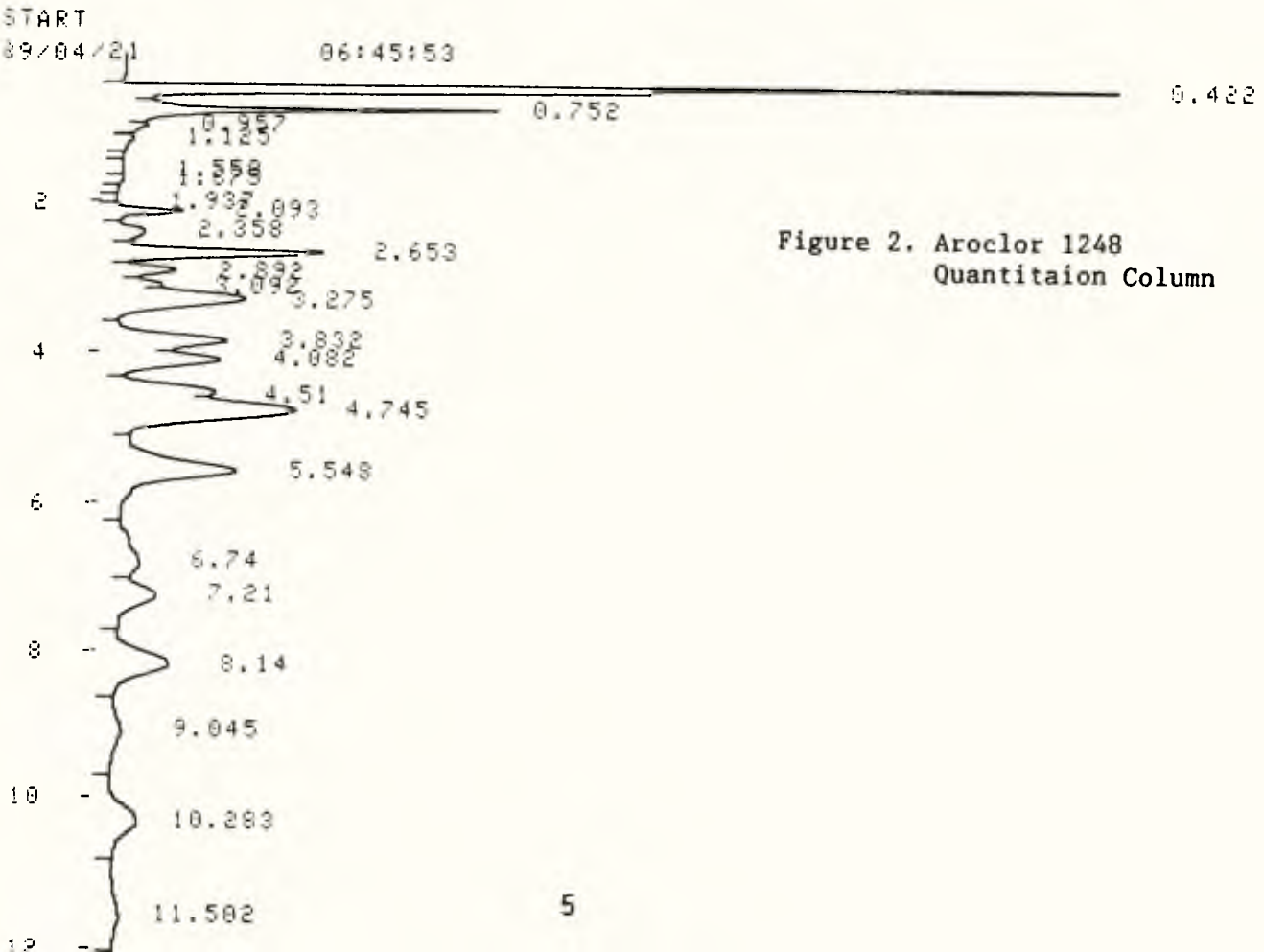


Figure 2. Aroclor 1248
Quantitaion Column

Figure 3. Aroclor 1254
Quantitation Column

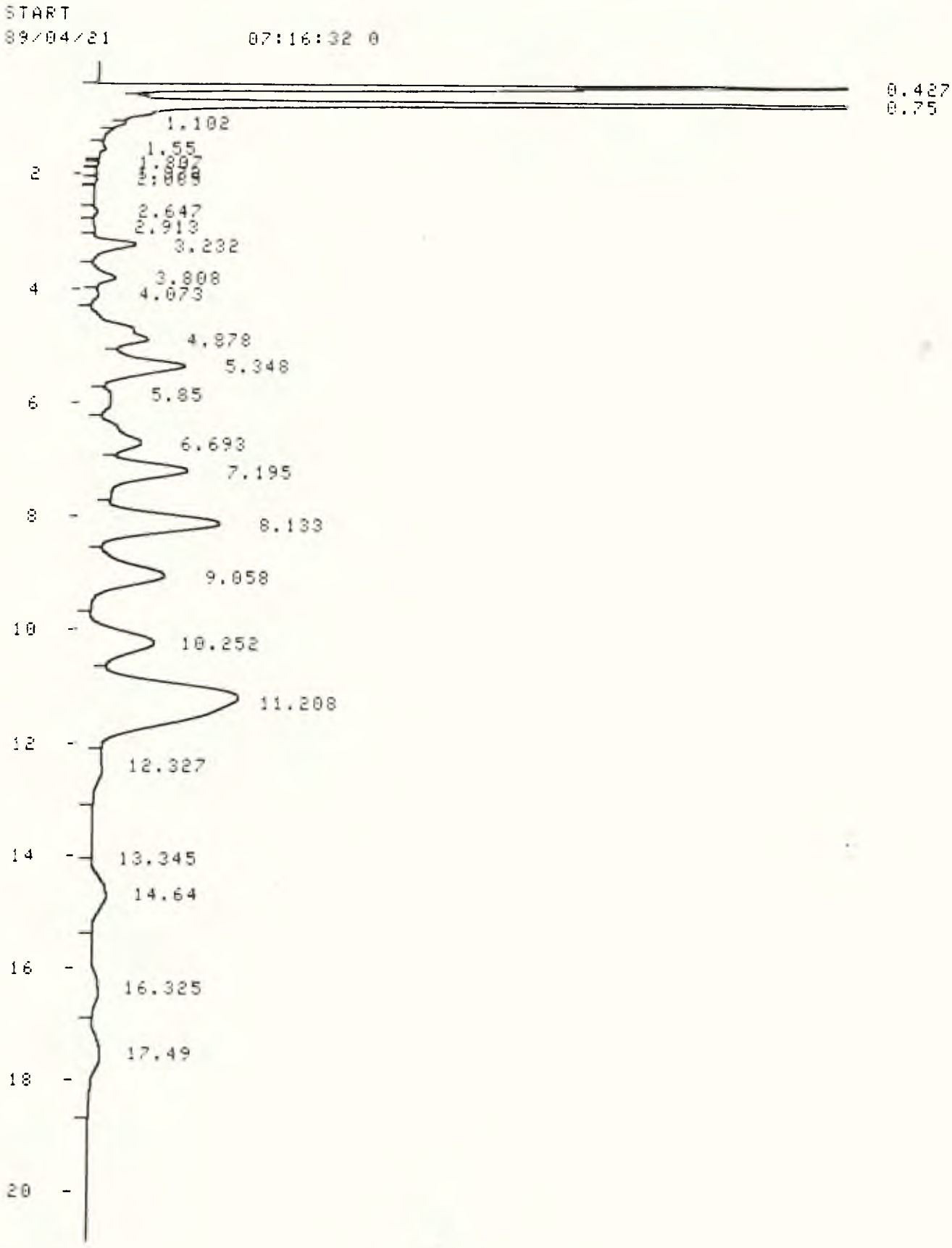
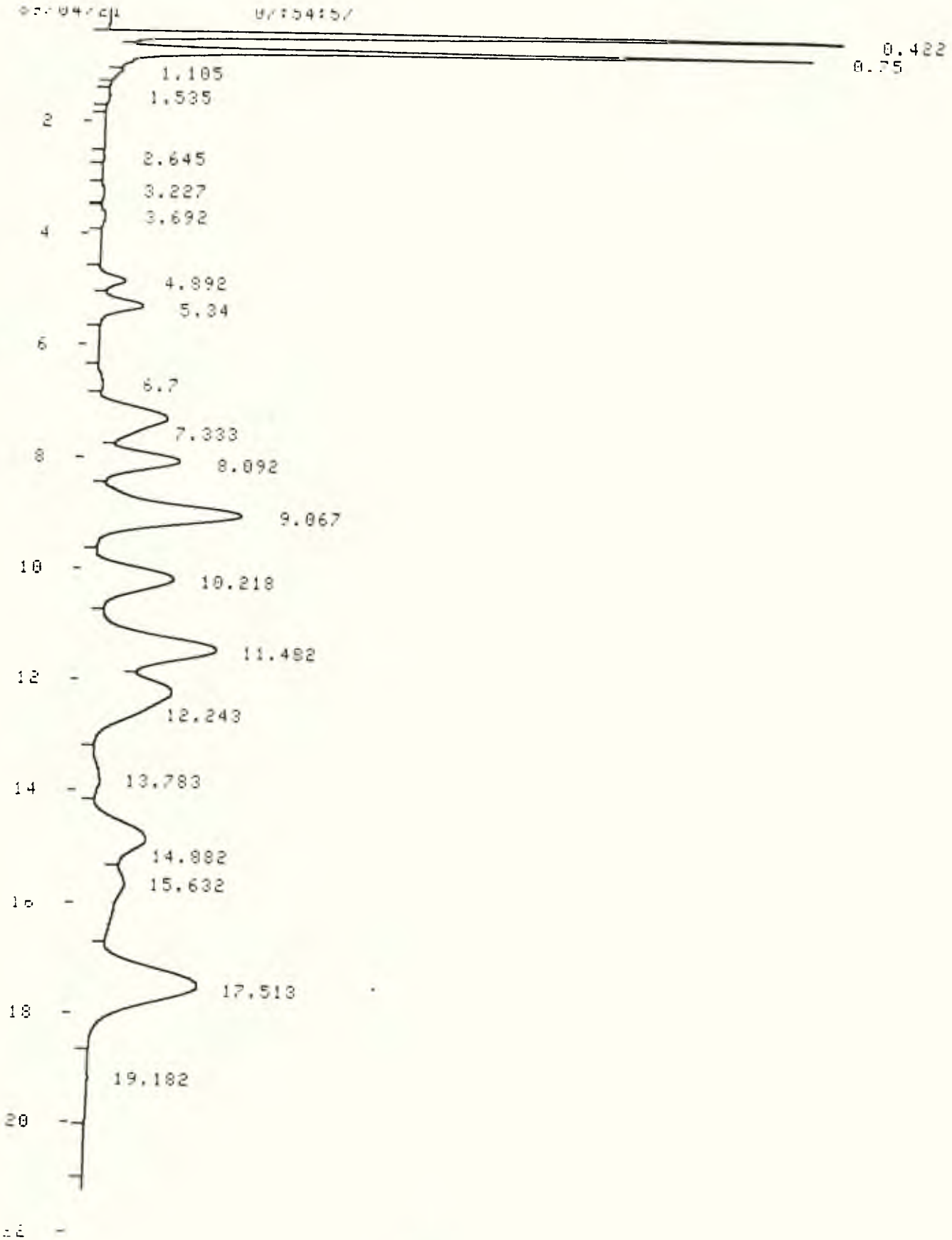


Figure 4. Aroclor 1260
Quantitation Column



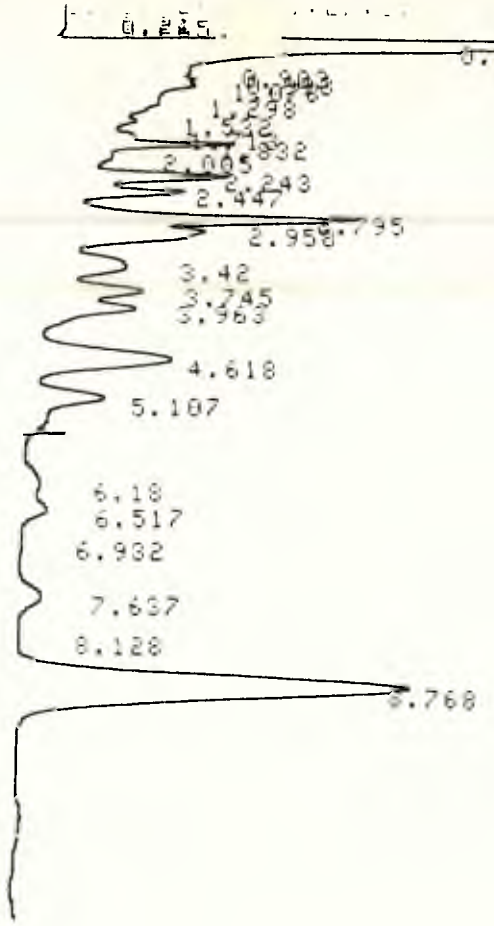


Figure 5. Aroclor 1242
Confirmation Column

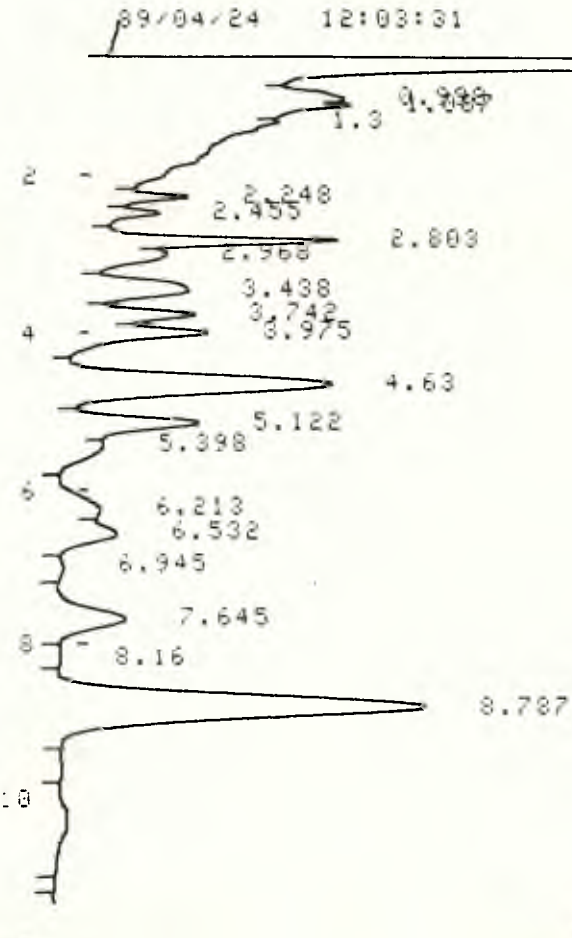


Figure 6. Aroclor 1248
Confirmation Column

Figure 7. Aroclor 1254
Confirmation Column

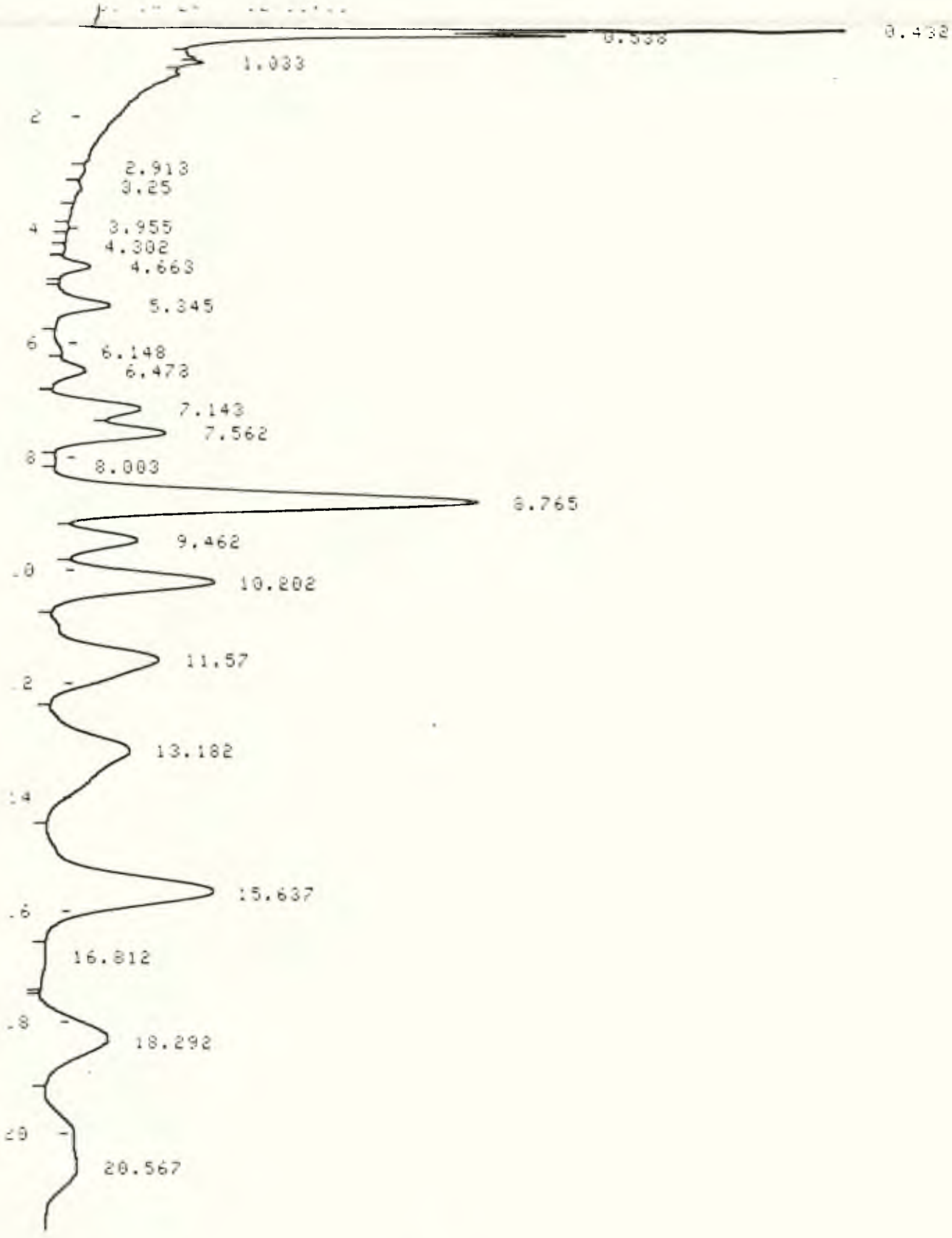
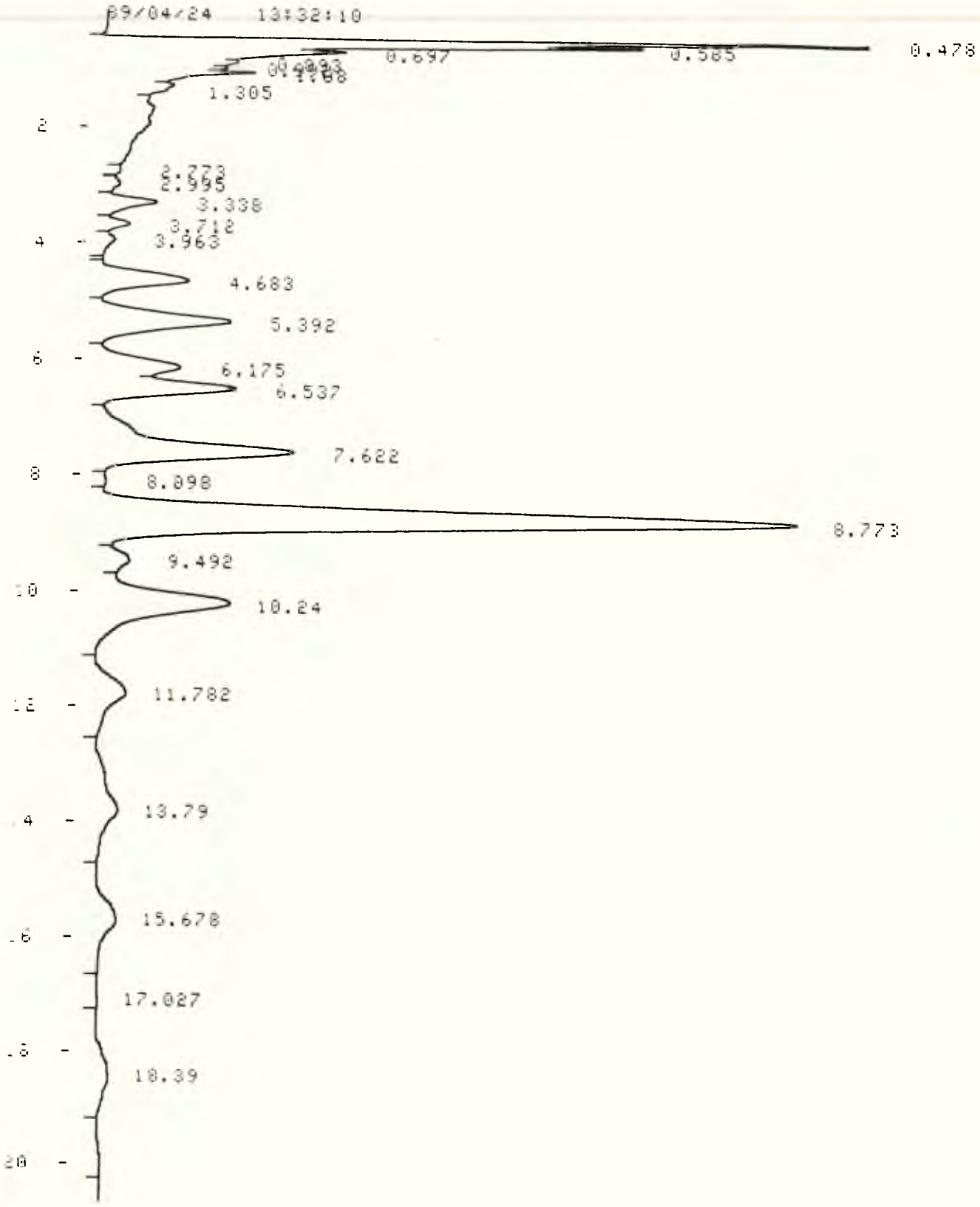


Figure 8. Aroclor 1260
Confirmation Column



3.0 FIELD SCREENING DATA

Field screening data are not confirmed by mass spectroscopy and, therefore, do not provide the same level of qualitative specificity as CLP data. While field screening data is not equivalent to or a replacement for CLP data, the results presented in this report are consistent (all samples were extracted and analyzed utilizing the same procedure). Data generated by the E & E Seattle Laboratory for the Magnum Salvage SSI were used to quantitate site contamination. The detection limits were as follows:

	Soil Samples
PCBs	1 mg/kg

3.1 PCB Screening Results

Aroclor 1242 . . . . . (A1242)
Aroclor 1248 . . . . . (A1248)
Aroclor 1254 . . . . . (A1254)
Aroclor 1260 . . . . . (A1260)

Aroclors were identified utilizing peak pattern matching of sample and standard chromatograms. Soil sample results are reported in wet mass concentrations (mg/kg).

Aroclor 1016, Aroclor 1221, Aroclor 1232, and Aroclor 1262 were not observed in any of the samples; one point calibrations were not performed for these Aroclors. A one-point calibration was performed for Aroclor 1242, to verify that it was not present in any of the samples. One-point calibrations were performed for A1248 and A1260. A three-point initial calibration and daily one-point calibrations were performed for A1254.

All positive results for all samples were analyzed on a second column (the confirmation column); all reported identifications were supported by results from the confirmation column.

PCB data is presented in numerical order by sample number in Table 3.1.

TABLE 3.1

SAMPLE RESULTS
POLYCHLORINATED BIPHENYL FASP ANALYSIS
MAGNUM SALVAGE/HORIZON VEHICLES, ALBANY, OREGON
mg/kg

	Compound			
Sample No.	A1242	A1248	A1254	A1260
SG1-A1	0.87 UF	0.87 UF	0.87 UF	10 F
SG1-A2	0.77 UF	0.77 UF	0.77 UF	380 F
SG1-A3	0.68 UF	0.68 UF	0.68 UF	0.85 F
SG1-A4	0.91 UF	0.91 UF	0.91 UF	Trace
SG1-B1	4.3 UF	4.3 UF	4.3 UF	7.6 F
SG1-B2	0.85 UF	0.85 UF	0.85 UF	14 F
SG1-B3	0.77 UF	0.77 UF	0.77 UF	9.0 F
SG1-B3D	0.78 UF	0.78 UF	0.78 UF	9.9 F
SG1-B3R	0.89 UF	0.89 UF	0.89 UF	8.0 F
SG1-B4	0.78 UF	0.78 UF	0.78 UF	1.2 F
SG1-C1	0.75 UF	0.75 UF	0.75 UF	8.0 F
SG1-C2	0.90 UF	0.90 UF	0.90 UF	Trace
SG1-C3	0.70 UF	0.70 UF	0.70 UF	1.8 F
SG1-C4	0.83 UF	0.83 UF	3.8 F	0.83 UF
SG1-D1	0.69 UF	2.4 F	0.69 UF	1.5 F
SG1-D2	0.70 UF	0.70 UF	0.70 UF	0.70 UF
SG1-D3	0.77 UF	0.77 UF	0.77 UF	3.5 F
SG1-D4	0.72 UF	0.72 UF	0.77 UF	1.5 F
SG2-A1	0.95 UF	0.95 UF	0.95 UF	0.95 UF
SG2-A2	0.94 UF	0.94 UF	0.94 UF	0.94 UF
SG2-A3	0.80 UF	0.80 UF	0.80 UF	0.80 UF
SG2-A4	0.93 UF	0.93 UF	0.93 UF	0.93 UF
SG2-A5	0.95 UF	0.95 UF	0.95 UF	0.95 UF
SG2-B1	0.90 UF	0.90 UF	0.90 UF	0.90 UF
SG2-B2	0.90 UF	0.90 UF	0.90 UF	0.90 UF
SG2-B3	0.88 UF	0.88 UF	0.88 UF	0.88 UF
SG2-B4	0.90 UF	0.90 UF	0.90 UF	Trace
SG2-B5	0.90 UF	0.90 UF	0.90 UF	0.90 UF
SG2-C1	0.88 UF	0.88 UF	0.88 UF	0.88 UF
SG2-C2	0.88 UF	0.88 UF	0.88 UF	0.88 UF
SG2-C3	0.89 UF	0.89 UF	0.89 UF	0.89 UF
SG2-C4	0.82 UF	0.82 UF	0.82 UF	0.82 UF
SG2-C5	0.95 UF	0.95 UF	0.95 UF	38 F

TABLE 3.1 (Cont.)

SAMPLE RESULTS
POLYCHLORINATED BIPHENYL FASP ANALYSIS
MAGNUM SALVAGE/HORIZON VEHICLES, ALBANY, OREGON
mg/kg

	Compound			
Sample No.	A1242	A1248	A1254	A1260
SG2-D1	0.93 UF	0.93 UF	0.93 UF	0.93 UF
SG2-D2	0.94 UF	0.94 UF	0.94 UF	0.94 UF
SG2-D3	0.95 UF	0.95 UF	0.95 UF	Trace
SG2-D4	0.86 UF	0.86 UF	0.86 UF	Trace
SG2-D5	0.83 UF	0.83 UF	13 F	0.83 UF

U - The material was analyzed for but was not detected. The associated numerical value is an instrumental detection limit, adjusted for sample weight, extract volume, and sample dilution.

F - Data has been generated using FASP methodologies. Analytes are tentatively identified and concentrations are quantitative estimates.

Trace - Compound was present at a detectable level, but was below the quantitation limit.

3.2 Polychlorinated Biphenyl QA/QC

3.2.1 Method Blank Results

TABLE 3.2.1

METHOD BLANK RESULTS, SOIL
POLYCHLORINATED BIPHENYL FASP ANALYSIS
MAGNUM SALVAGE/HORIZON VEHICLES, ALBANY, OREGON
mg/kg

	Compound			
Sample No.	A1242	A1248	A1254	A1260
MB-1	1.0 UF	1.0 UF	1.0 UF	1.0 UF
MB-2	1.0 UF	1.0 UF	1.0 UF	1.0 UF

U - The material was analyzed for but was not detected. The associated numerical value is an instrumental detection limit, adjusted for sample weight, extract volume, and sample dilution.

F - Data has been generated using FASP methodologies. Analytes are tentatively identified and concentrations are quantitative estimates.

3.2.2 Matrix Spike Results

TABLE 3.2.2

MATRIX SPIKE RECOVERY RESULTS, SOIL
POLYCHLORINATED BIPHENYL FASP ANALYSIS
MAGNUM SALVAGE/HORIZON VEHICLES, ALBANY, OREGON
mg/kg

Sample ID	Amount A1254 Spiked	Sample	Sample with Spike	Percent Recovery
SG1-D2	2.5	0.70 UF	2.97 F	118
SG2-D2	2.5	0.94 UF	3.30 F	132

U - The material was analyzed for but was not detected. The associated numerical value is an instrumental detection limit, adjusted for sample weight, extract volume, and sample dilution.

F - Data has been generated using FASP methodologies. Analytes are tentatively identified and concentrations are quantitative estimates.

3.2.3 Duplicate Results

TABLE 3.2.3

DUPLICATE RESULTS
POLYCHLORINATED BIPHENYL FASP ANALYSIS
MAGNUM SALVAGE/HORIZON VEHICLES, ALBANY, OREGON
mg/kg

Sample No.	Sample Result	Duplicate Result	Percent Difference
SG1-D1	A1242 = 0.69UF	A1242 = 0.87UF	--
	A1248 = 2.4F	A1248 = 2.5F	4.1
	A1254 = 0.69UF	A1254 = 0.87UF	--
	A1260 = 1.5F	A1260 = 1.6F	6.7
SG2-D5	A1242 = 0.83UF	A1242 = 1.0UF	--
	A1248 = 0.83UF	A1248 = 1.0UF	--
	A1254 = 13F	A1254 = 7.9F	39.2
	A1260 = 0.83U	A1260 = 1.0UF	--

U - The material was analyzed for but was not detected. The associated numerical value is an instrumental detection limit, adjusted for sample weight, extract volume, and sample dilution.

F - Data has been generated using FASP methodologies. Analytes are tentatively identified and concentrations are quantitative estimates.